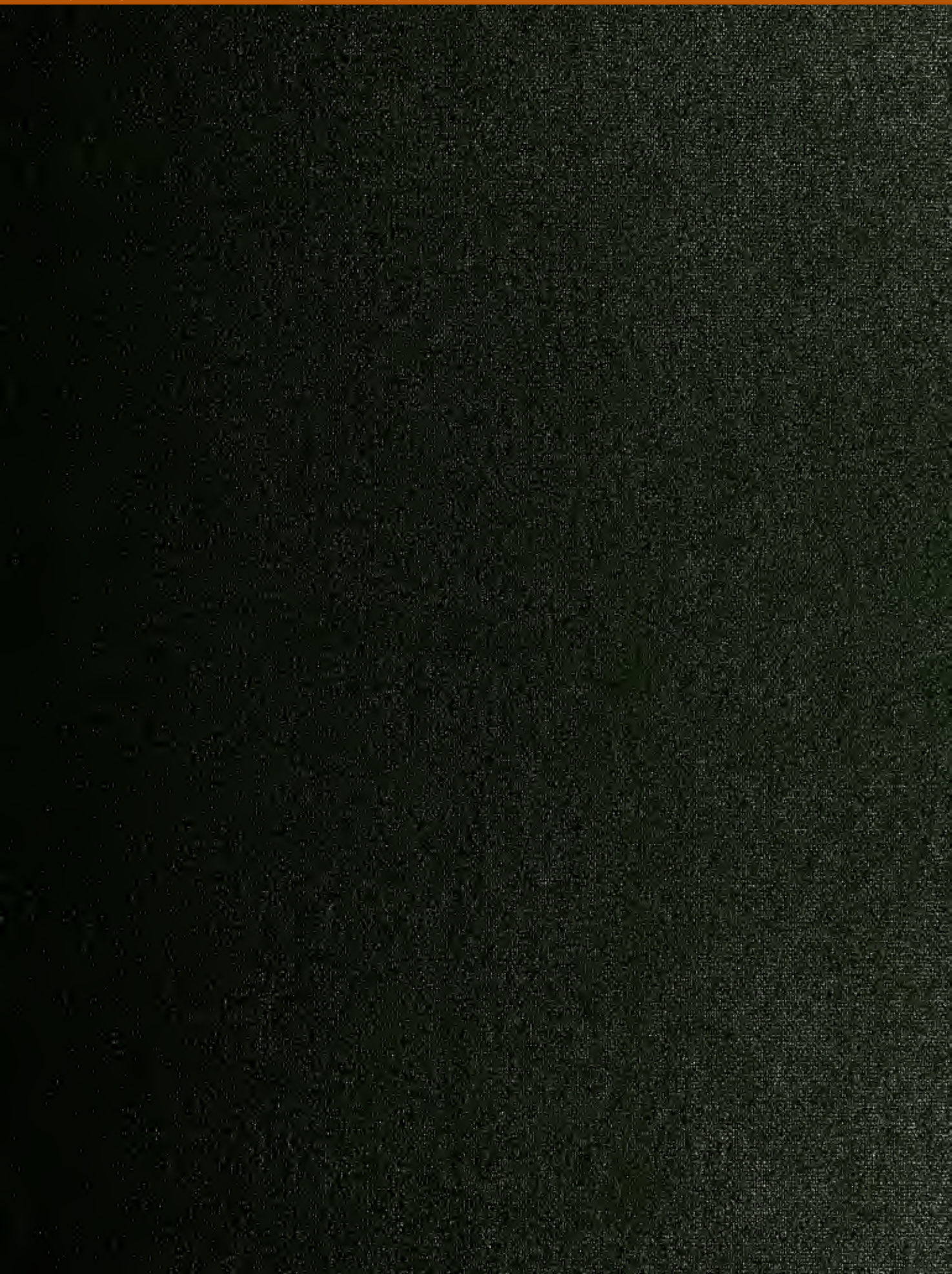

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Attributability and Distributability of Profit to Shareholders

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Attributability and Distributability of Profit to Shareholders

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Abstract

Current cost "profit attributable to shareholders," as required by the United Kingdom's Accounting Standards Committee, is analyzed by comparing the outputs of required measurement procedures with the conceptual intent of those procedures. A numerical example and computer simulation are used to demonstrate four deficiencies in the present procedures. Four alternative procedures are recommended that, in addition to being more consistent with the conceptual intent, are less complex than the present procedures. The findings imply a need to analyze other measurement procedures and to exercise caution in interpreting empirical results until major deficiencies have been eliminated.

ATTRIBUTABILITY AND DISTRIBUTABILITY OF PROFIT TO SHAREHOLDERS

Current-cost accounting prescribed by the U. K. Accounting Standards Committee in SSAP 16 is intended to represent profits from two different viewpoints:

> The current cost operating profit is the surplus arising from the ordinary activities of the business in the period after allowing for the impact of price changes on the funds needed to continue the existing business and maintain its operating capability, whether financed by share capital or borrowing.
>
> The current cost profit attributable to shareholders is the surplus for the period after allowing for the impact of price changes on the funds needed to maintain their [shareholders'] proportion of the operating capability. [ASC, 1980a, paras. 40, 41]

It is the shareholders' view of profit that is analyzed in this paper.

While much has been written about the relevance of the capital maintenance concept underlying the latter view of profit [e.g., Egginton, 1980; Forker, 1980, 1982; Revsine, 1981; MacDonald, 1982], little has been written about whether the promulgated measurement procedures are reliable for measuring whether the shareholders' portion of operating capability has been maintained. The purpose of this paper is to analyze the procedures of SSAP 16 and to recommend four modifications. The analysis indicates that greater reliability could be obtained with accounting procedures that are less complex than those currently in use.

The next section of this paper deals with the capital maintenance concept that underlies profit attributable to shareholders and develops a criterion for assessing the reliability of measurement procedures in

SSAP 16. The subsequent section analyzes four procedural deficiencies associated with the gearing adjustment and the depreciation adjustment. That analysis is followed by a summary of the recommendations and their implications for related research.

THE CONCEPTUAL INTENT OF PAS

The conceptual intent of profit attributable to shareholders (PAS) can be determined by reference to its capital "benchmark." As discussed by Egginton [1980] and Forker [1980], the neutral benchmark for measuring profit during a period is capital at the beginning of the period, with each concept of capital implying a distinct concept of profit. In the case of PAS, the capital benchmark is the shareholders' proportion of the firm's beginning operating capability [ASC, 1980a, para. 6], which is comprised of physical assets plus monetary working capital [para. 3].

The primary import of this concept can be demonstrated by a simple example in which a firm has the following current-cost balance sheets.

	Beginning	Ending
Net operating assets	100	110
Net borrowing	(40)	(40)
Shareholders' interest	60	70

The company's ending assets represent the same operating capability as its beginning assets (i.e., the prices of the assets increased by 10 percent). The shareholders' surplus is 4 because their beginning proportion of operating capability could be maintained with an ending

shareholders' interest of only 66 (66/110 = 60/100 = 60 percent). According to Godley and Cripps [1975], this firm could borrow 4 and distribute it to owners while maintaining their 60-percent share of the firm's operating capability. This amount that is conceptually distributable is referred to below as PDO (profit distributable to owners) to distinguish it from the accounting measurement (PAS).

The previous wording does not imply that PDO is always the most prudent amount to distribute [Egginton, 1980]. It is possible that creditors would no longer wish to finance 40 percent, in which case nothing could be distributed without liquidating some of the operating assets. Alternatively, it might be prudent to retain profits for the purpose of expanding operating capability, perhaps with the same proportion subsequently financed by borrowing. Measuring the amount distributable relative to a given benchmark does not prejudge the amount that should be distributed. In case of nondistribution, for either of the latter reasons, the owners' share of operating assets will have increased from 60 percent to 63.6 percent (70/110), an increase that is worth 4 monetary units at current prices. Thus PDO is the shareholders' surplus whether it is distributed or not. (endnote)

To facilitate the following analysis, PDO is distributed. To do so requires additional borrowing because of rising costs, in which case the ASC implies that PAS is fully distributable [1980a, para. 23]. If the ASC's procedures for measuring PAS are reliable, then PAS would equal the actual distribution while maintaining the owners' share of the firm's operating capability. If not, the ASC's procedures may need to be modified.

COMPARING REPRESENTATIONS WITH INTENTIONS

Four procedural problems of PAS were discovered through the use of computer simulation, a technique suggested by Arnold and Hope [1975]. A drawback of using the same technique to demonstrate the problems, however, is that it places a heavy demand on the reader's faith in the credibility of the simulation, especially when the results are produced by complex interactions among the individual procedural problems. In an effort to minimize this demand on the reader, the individual procedural problems are addressed sequentially after providing a numerical example to serve as a cross-check on the validity of the simulation results. The latter results are shown by plotting time series of PDO and PAS, time series whose general configurations can be confirmed by reference to the simpler example.

First consider "Firm A," with the following characteristics:

1. The company purchases a single asset at the end of 19X0 for 9000, which is financed 40 percent by borrowing.
2. The asset has a three-year life with no salvage value and depreciation is computed on the straight-line basis.
3. All transactions are made in cash.
4. The company rents the asset to its customers.
5. There is no income tax.
6. Asset costs increase at a 10 percent annual rate.
7. The annual interest rate is 14 percent.
8. The company distributes the criterion, PDO, each year.

Exhibit I shows the current-cost balance sheets and cash flow summaries

for the first three years of Firm A's existence. To facilitate comparisons between PAS and PDO, repairs and maintenance costs were calculated so that Firm A's return on owners' equity (ROE) is a constant 6 percent. Having a constant ROE makes the analysis somewhat easier to follow, but this condition does not affect the general nature of the conclusions. It should be noted that exactly maintaining shareholders' interest does not imply that the gearing proportion remains constant from year to year. As shown in Exhibit I, the gearing proportion for Firm A ranges from +40 percent to -80 percent.

PDO is equal to dividends in Exhibit I because they allow the owners to maintain their sixty percent share of the original operating capability after dividends are distributed each year:

	12/31/X0	12/31/X1	12/31/X2	12/31/X3
Shareholders' interest after dividends	5400	5940	6534	7187
Current cost of new operating asset	9000	9900	10890	11979
Shareholders' interest as proportion of original operating capability	60 %	60 %	60 %	60 %

Since shareholders' interest is being maintained, the dividends distributed by Firm A must be equal to PDO.

Calculation of PAS

The ASC [1980a] recommends calculating PAS as follows (assuming rising prices):

Historical cost profit before interest and taxes
- Current cost depreciation adjustment (DA)
- Current cost cost of sales adjustment (COSA)
± Monetary working capital adjustment (MWCA)
= Current cost operating profit
± Interest
- Taxes
+ Gearing adjustment (GA)
= PAS

The simple company being analyzed has no stock (inventory), therefore there is no need for the COSA. Similarly, since all transactions are in cash, the MWCA is zero. The latter condition allows the analysis to focus on the gearing adjustment without any complications that could arise from the MWCA.

Exhibit 2 shows the PAS calculations for Firm A. The top of the exhibit presents the ASC's recommended calculations assuming that the company uses historical-cost accounting as its primary system. The depreciation adjustment (DA) is the difference in the average current cost and the historical cost of the asset times the one-third depreciation rate. In 19x2, for example,

$$DA = (1/3)[(9900 + 10890)/2 - 9000] = 465.$$

The lower part of the exhibit presents a direct method of calculating

PAS that would be allowable by SSAP 16 [ASC, 1980a, para. 28] for companies with primary current-cost accounting systems. The gearing adjustment (GA) is discussed in detail below.

PAS understates PDO when the asset is relatively new and overstates it as the asset becomes older. This pattern is indicated in Exhibit III for Firm A, and the plots in Exhibit IV indicate the same pattern for Firm B, which has several different characteristics. Firm B is similar to Firm A in that there is no stock, all transactions are made in cash, there is no taxation, the initial gearing proportion is forty percent, and Firm B also distributes PDO as a dividend each year. Firm B differs from Firm A in that Firm B's equipment has a ten-year life, costs increase at a six percent rate, and ROE is constant at four percent. In spite of these differences, PAS understates Firm B's PDO in early years and overstates it in later years of each asset's life. The pattern appears three times for Firm B because three assets are used during the thirty-year simulation. Cumulative PAS overstates cumulative PDO for both firms.

FOUR DEFICIENCIES IN THE PAS MEASUREMENT PROCEDURES

The pattern shown for PAS results from the interaction of four individual problems contained in the SSAP 16 procedures. Details of those procedures and the recommended modifications are summarized in the following table.

Procedure	SSAP 16	Recommended
1. Application of GA	when net borrowing is positive	always
2. Basis of GA:		
a. cost increase	average minus historical cost	ending minus beginning cost
b. proportion of cost increase	fraction used currently	fraction unused at beginning
3. Gearing proportion used in GA	average	beginning
4. Cost for calculating depreciation	average	ending

Each recommendation is explained below in terms of the problem it is intended to remedy.

Asymmetric Application. The first recommendation is to apply the gearing adjustment unconditionally, i.e., without regard to the sign of net borrowing. As Forker notes [1980, pp. 394-395], it is logically inconsistent to apply a gearing adjustment when net borrowing is positive but not when it is negative (when monetary investments exceed borrowing). If there is a gain from borrowing when costs are rising, then there must be a loss from lending under the same condition.

By itself, however, this first recommendation is not sufficient to make PAS a reliable estimate of PDO. PAS(1) is PAS calculated after eliminating the problem of asymmetric application with regard to the

sign of net borrowing. Exhibit III indicates that PAS(1) produces an underestimate of PDO in 19x3, rather than the overestimate produced by PAS with the asymmetry problem. A more complete pattern is provided by the plot of PAS(1) in Exhibit V for Firm B. For both firms, PAS(1) produces a pattern of understatement, then overstatement, then understatement of PDO as the asset ages.

Dependency on Historical-Cost Accounting. The pattern of PAS(1) is caused by a different sort of inconsistency: a current-cost adjustment that depends on historical-cost accounting. In SSAP 16, the gearing adjustment is based on the DA, which is the difference between current-cost depreciation and historical-cost depreciation. Consider how this basis differs from the recommended basis for Firm A:

	19X1	19X2	19X3
SSAP 16	(1/3)(450)=150	(1/3)(1395)=465	(1/3)(2435)=812
Recommended	(3/3)(900)=900	(2/3)(990)=660	(1/3)(1089)=363

The recommended basis is the annual increase in the cost of maintaining beginning operating capability, which is consistent with the conceptual intent of SSAP 16.

Using the DA as the basis is conceptually inconsistent for at least two reasons. First, the DA uses the fraction consumed during the year rather than the unused fraction available at the beginning of the year. This makes the gearing adjustment too low when the asset is relatively new, thus underestimating PDO. Second, as the asset gets older, the difference between current-cost depreciation and historical-cost depreciation becomes much larger than the annual increase in the cost of

a new asset. The latter dependency makes the gearing adjustment too high, either positively or negatively for PAS(1), depending on the sign of net borrowing. Since net borrowing becomes negative for both firms soon after the DA exceeds the annual increase in cost, the latter dependency has no effect on PAS but causes PAS(1) to underestimate PDO when the asset is relatively old. The effect on PAS(1) is more pronounced for Firm B because a six-percent annual increase for ten years is relatively larger than a ten-percent increase for three years.

Applying the second recommendation eliminates the understatements and reduces the variability of PAS. This can be determined from PAS(2), which incorporates symmetrical application as well as the recommended cost basis. PAS(2) is calculated for Firm A in Exhibit III and plotted for Firm B in Exhibit VI. In both exhibits, PAS(2) produces a pattern of increasing overstatement, peaking in the year of replacement.

Average Gearing Proportion. All of the variability of PAS(2) results from unnecessary complexity in calculating the gearing proportion. Although other interpretations are possible, PAS, PAS(1) and PAS(2) are based on the simplest interpretation of "weighted average," which SSAP 16 recommends when substantial changes in borrowing occur during the period [1980b, para. 112]. "Weighted-average net borrowing" (L) is calculated as the beginning balance of net borrowing because all changes take place at year-end. "Weighted-average shareholders' interest" (S) is calculated as a simple average of the beginning and ending balances because earnings occur evenly during each year. The resulting average gearing proportion for Firm A in 19X1 is

$$L / (L + S) = 3600 / [3600 + (5400 + 5940)/2] = .388,$$

and proportions for the other years are calculated in a similar fashion. The variability of PAS(2) can be explained by comparing these average gearing proportions with the recommended proportions:

	12/31/X1	12/31/X2	12/31/X3
Average (SSAP 16)	.388	.096	-.734
Beginning (recommended)	.400	.100	-.800

The beginning proportion is recommended because the conceptual benchmark for PAS is beginning net operating capability. Since average shareholders' interest exceeds beginning shareholders' interest, the average proportion is always closer to zero than the beginning proportion. The result is a gearing adjustment that is too low when net borrowing is positive and too high (less negative) when net borrowing is negative.

It is worth noting that the preceding interpretation and other defensible interpretations of SSAP 16 could be selected for the purpose of manipulating reported profits. Depending on the intended manipulation, a firm could include or exclude accrued interest in "weighted-average net borrowing," include or exclude dividends in "weighted-average shareholders' interest," or use a simple average for either amount. At least 64 interpretations are possible for artificially increasing or decreasing reported profits.

In addition to being simpler, use of the beginning gearing proportion could reduce both the variability and the manipulatability of PAS. PAS(3) incorporates this third recommendation as well as the first two recommendations. As indicated in Exhibits III and VI, the pattern of PAS(3) is a consistent overstatement of PDO for both firms.

Average Cost for Depreciation. The pattern of PAS(3) results entirely from the use of average current cost in the calculation of depreciation expense. The general procedure illustrated in the Guidance Notes to SSAP 16 [1980b, appendix(vii)] is to restate beginning and ending fixed asset balances in terms of average current costs before calculating depreciation. The recommended procedure is to restate balances to ending cost. This recommendation is consistent with the previously recommended cost basis for the gearing adjustment, which is in turn consistent with the conceptual benchmark of beginning net operating capability.

Applying this fourth recommendation to PAS(3) produces PDO. Eliminating the need for a "backlog" reconciling adjustment (from average to ending cost), this recommendation is is also consistent with the reasoning of the Sandilands Committee [1975] and Sale and Scapens [1978]. It should be noted that the overstatement caused by using average current costs is constant for both firms only because prices are rising at a constant rate. If prices were to rise at a variable rate, the differences between PAS(3) and PDO would be variable. Whether the rate is constant or variable, however, the differences can be eliminated by the fourth recommendation.

GREATER RELIABILITY WITH LESS COMPLEXITY

The complexity of these problems may tend to obscure the relative simplicity of the recommended modifications. If "profit attributable to shareholders" is to reliably measure the "surplus for the period after allowing for the impact of price changes on the funds needed to maintain the shareholders' proportion of the operating capability" [ASC, 1980a, para. 6], we recommend modification of four procedures promulgated in SSAP 16:

1. make a gearing adjustment regardless of the sign of net borrowing (vs. only when it is positive);
2. use the annual increase in cost of maintaining beginning operating capability (vs. the DA) as the cost basis for the gearing adjustment;
3. use the beginning gearing proportion (vs. an average) for the gearing adjustment; and
4. calculate depreciation by restating asset balances to ending costs (vs. average costs).

The first recommendation calls for procedural symmetry. Each of the latter recommendations calls for simpler calculations than those promulgated by SSAP 16.

Both simplicity and reliability can be illustrated with the journal entries implied by these recommendations. Assuming that Firm A has an operational current-cost accounting system, it would have made the following entries (with credits in parentheses).

	19X1	19X2	19X3
(1) To record increase in costs of beginning operating capability:			
Fixed asset	900	990	1089
Accumulated depreciation	-	(330)	(726)
Increased cost of maintaining operating capability	(900)	(660)	(363)
(2) To record depreciation:			
Depreciation expense *	3300	3630	3993
Accumulated depreciation	(3300)	(3630)	(3993)
* 1/3 of fixed asset balance after adjustment (1)			
(3) To record gearing:			
Increased cost of maintaining operating capability	900	660	363
Gearing adjustment **	(360)	(66)	290
Increased cost of maintaining the owners' share of operating capability	(540)	(594)	(653)

** Calculations of gearing adjustment:

19X1 : .40(900)= 360
19X2 : .10(660)= 66
19X3 : -.80(363)= -290

Notice that the adjustment for increased cost of maintaining the owners' share of operating capability (taken to current cost reserve) increases by ten percent each year. This result satisfies Agrawal's criterion: "a perfect correlation with the price-rise affecting the entity" [1977, p. 790]. Notice also that the adjustment equals sixty percent of the annual increase in asset cost. The latter result is consistent with the objectives of Godley and Cripps [1975] and SSAP 16 for representing the effect of increased costs on the shareholders' interest in the firm's operating capability.

It could be important that these recommended procedures are simpler than those of SSAP 16. Westwick [1980] says that simplicity can increase the acceptability of accounting standards. If simplicity can

be coupled with conceptual soundness, as we have attempted to do in this paper, the result should be accounting standards that are more readily understandable to users and to the accountants who must apply those standards.

IMPLICATIONS FOR FURTHER RESEARCH

The results of the preceding analysis suggest that other accounting procedures could be improved and perhaps simplified by comparing their outputs with the concept those procedures are intended to represent. For example, the finding that averages are inappropriate for the gearing adjustment suggests potential problems for the cost of sales adjustment and the monetary working capital adjustment, both of which currently involve averaging procedures. The results of such analyses might further suggest weaknesses in other procedures not addressed in this paper.

May and Sundem [1976] recommend that such analyses should precede empirical research that deals with uses and correlations of reported numbers. Inferences about reported numbers cannot indicate potential relevance of accounting concepts unless those numbers closely approximate the concepts they are intended to represent. For this reason, we suggest that procedural analyses could substantially increase the validity of subsequent empirical research.

FIRM A - SELECTED FINANCIAL INFORMATION

CURRENT-COST BALANCE SHEETS

	12/31/X0	12/31/X1	12/31/X2	12/31/X3
Asset	9000	9900	10890	11979
Accumulated depreciation		(3300)	(7260)	
Operating assets	9000	6600	3630	11979
Net borrowing	(3600)	(660)	2904	(4792)
Shareholders´ interest	5400	5940	6534	7187
Gearing proportion *	40 %	10 %	-80 %	40 %

* net borrowing / operating assets

CASH FLOW SUMMARIES

	19X1	19X2	19X3
Rent	5000	5500	6050
Repairs and maintenance	(1232)	(1488)	(1782)
Interest	(504)	(92)	407
Borrowing (payment)	(2940)	(660)	4792
Monetary (investment) withdrawal		(2904)	2904
Purchase of asset			(11979)
Dividend = PDO	324	356	392
Return on shareholders´ interest	6 %	6 %	6 %

EXHIBIT I

FIRM A - CALCULATION OF PAS

INDIRECT METHOD

	19X1	19X2	19X3
Rent	5000	5500	6050
Repairs and maintenance	(1232)	(1488)	(1782)
Historical-cost depreciation	(3000)	(3000)	(3000)
Historical-cost profit before interest	2000	2500	3050
Current-cost depreciation adjustment (DA)	(150)	(465)	(812)
Current-cost operating profit	618	547	456
Interest	(504)	(92)	407
Gearing adjustment (GA)	58	45	
Profit attributable to shareholders (PAS)	172	500	863

DIRECT METHOD

Rent	5000	5500	6050
Repairs and maintenance	(1232)	(1488)	(1782)
Depreciation	(3150)	(3465)	(3812)
Current-cost operating profit	618	547	456
Interest	(504)	(92)	407
Gearing adjustment	58	45	
Profit attributable to shareholders	172	500	863

EXHIBIT II

FIRM A - SUMMARY OF VARIOUS PROFIT CALCULATIONS

	19X1	19X2	19X3
PDO:			
Amount	324	356	392
ROE	6 %	6 %	6 %
PAS:			
Amount	172	500	863
ROE	3.2 %	8.4 %	13.2 %
PAS(1):			
Amount	172	500	267
ROE	3.2 %	8.4 %	4.1 %
PAS(2):			
Amount	463	518	597
ROE	8.6 %	8.7 %	9.1 %
PAS(3):			
Amount	474	521	573
ROE	8.8 %	8.8 %	8.8 %

EXHIBIT III

FIRM B - PLOTS OF PDO AND PAS

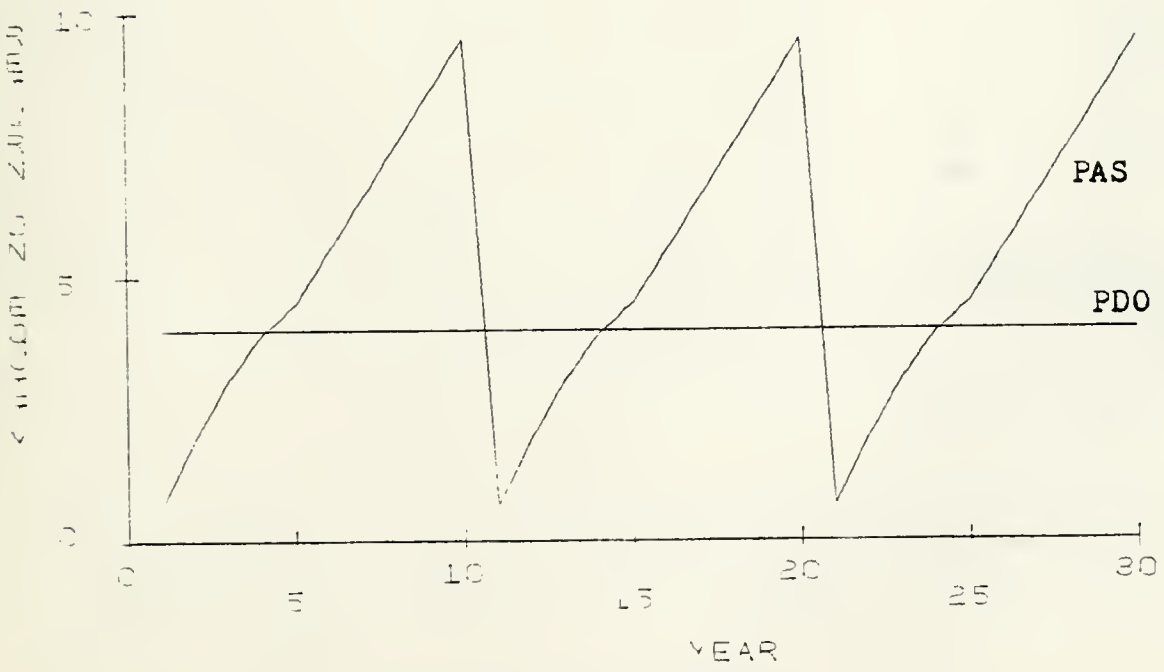

EXHIBIT IV

FIRM B - PLOT OF PAS(1)

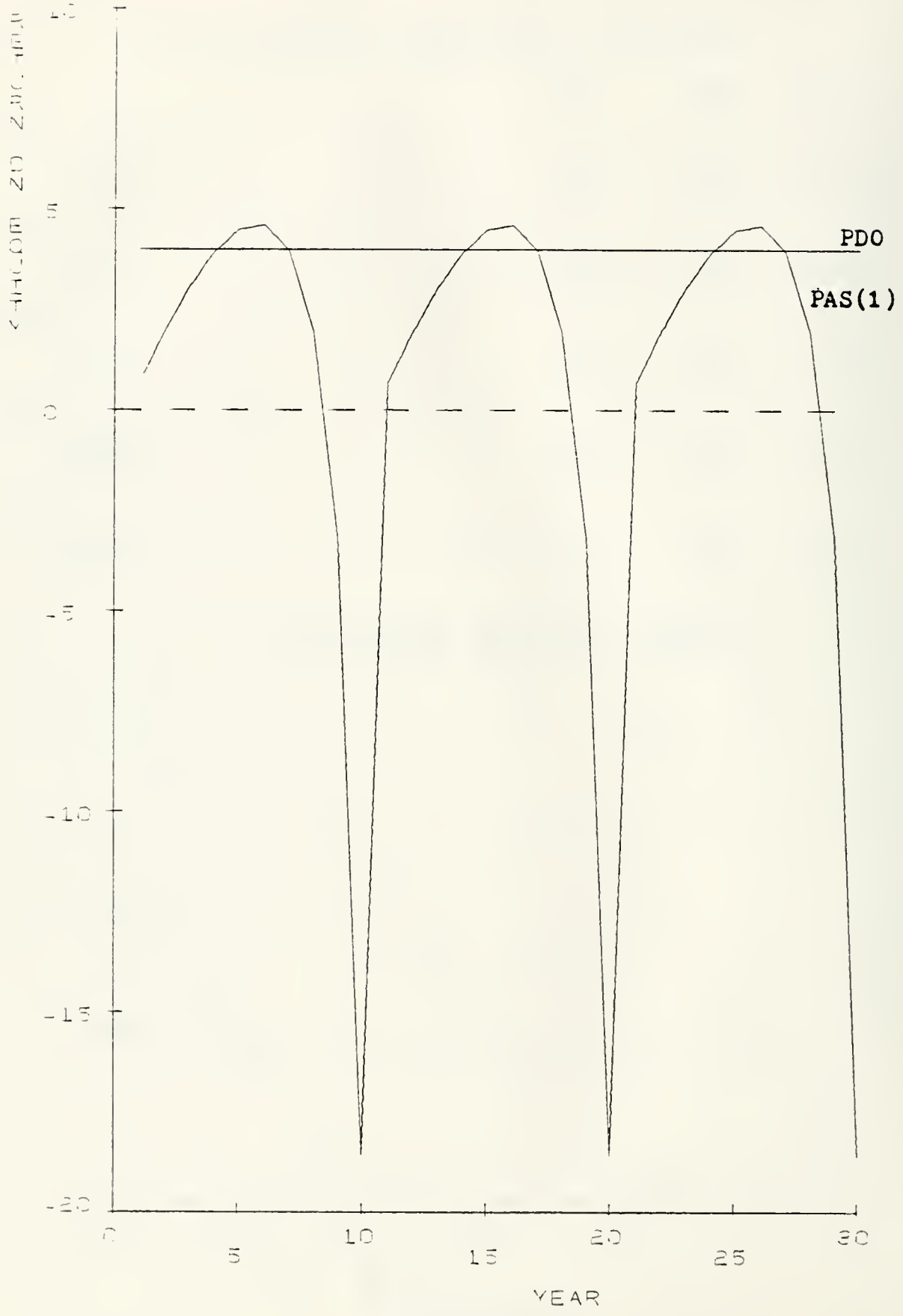

EXHIBIT V

FIRM B - PLOTS OF PAS(2) AND PAS(3)

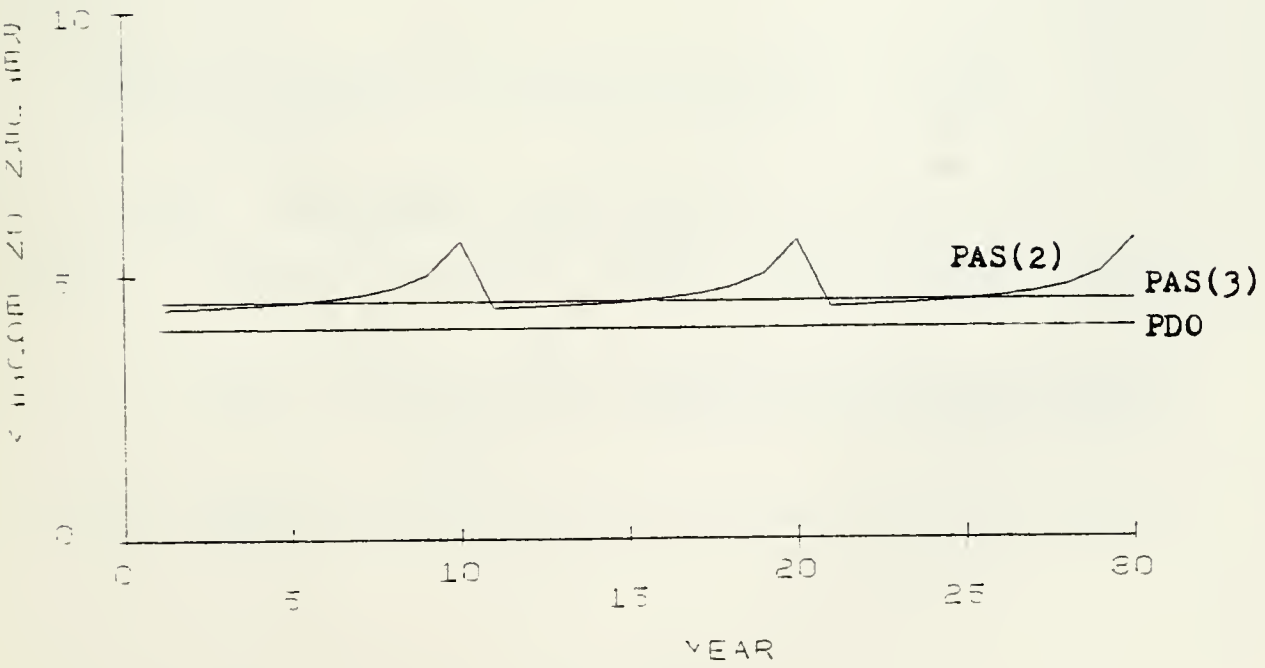

EXHIBIT V.I

ENDNOTE

We accept the conceptual intent of PAS without judging its merits relative to other concepts of profit. Forker [1980] prefers the benchmark to be defined as the general purchasing power of the beginning shareholders' interest. Revsine [1981] accepts the physical nature of operating capability but defines distributees to include creditors as well as owners. Conflicting interpretations of the proprietary focus of PAS are given by Kennedy [1978] and Egginton [1980]. While these issues are important, they are set aside in this paper to focus on a different issue: whether the procedural consequences of PAS are consistent with the conceptual goal stated in SSAP 16.

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